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157. Proposed by B.F.FINKEL, A.M., M.Sc., Professor of Mathematics and Physics, Drury College, Springfield, Mo.

January 1, 1899, A and B entered into partnership for 3 years. A put in \$10,000 and B put in \$5,500. July 1, 1899, B put in \$1,500 more. October 1, A took out \$500. January 1, 1900, each put in \$1,500. July 1, 1900, they dissolved partnership, and found that they had lost \$846. What is each partner's share of the loss?

Solution by J. R. HITT. Choral Institute, San Marcos, Texas, and HON. JOSIAH H. DRUMMOND. Portland, Maine.

A has in \$10,000 for 9 months, \$9,500 for 3 months, \$11,000 for 6 months. B has in \$5,500 for 6 months, \$7,000 for 6 months, \$8,500 for 6 months. Assuming the loss to be 10% of investment, A's loss would be  $\$750 + \$237.50 + \$550 = \$1537.50$ . B's would be  $\$275 + \$350 + \$425 = \$1050$ .

Hence,  $\$1537.50 + \$1050 : \$846 = \$1537.50 : \$502.696$ , A's loss.

$\$1537.50 + \$1050 : \$846 = \$1050 : \$343.304$ , B's loss.

Also solved by G. B. M. ZERR. Professor Hitt should have received credit for solving 156.

158. Proposed by JAMES F. LAWRENCE, A. B.. Professor of Mathematics, Rogers Academy, Rogers, Ark.

My agent sold pork at 5% commission; increasing the proceeds by \$20, I ordered the purchase of flour at 3% commission; after which flour rose 9%, my whole gain was \$40. What did he sell the pork for?

Solution by G. B. M. ZERR, A. M., Ph. D., Professor of Chemistry and Physics in The Temple College, Philadelphia, Pa.

Let 100% = selling price of pork.

100% + \$20 = total cost.

$(95\% + \$20) \frac{100}{103} = 100 \frac{55}{103}\% + \$21 \frac{17}{103}$ , selling price of flour.

$100 \frac{55}{103}\% + \$21 \frac{17}{103} - 100\% - \$20 = \$40$  gain.

$\therefore \frac{55}{103}\% = \$38 \frac{8}{103}$ .  $\therefore 1\% = \$72 \frac{8}{11}$ .

$100\% = \$7272 \frac{8}{11}$ , selling price of pork.

Also solved by J. R. HITT.

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## ALGEBRA.

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145. Proposed by W. J. GREENSTREET. M. A.. Editor of The Mathematical Gazette, Stroud, Gloucestershire, England.

Factorize  $2b^2c^2 + 2c^2a^2 + 2a^2b^2 + 2a^2d^2 + 2b^2d^2 + 2c^2d^2 - a^4 - b^4 - c^4 - d^4$ .

No correct solution of this problem has been received.

146. Proposed by B. F. YANNEY, Professor of Mathematics, Mount Union College, Alliance, Ohio.

If the series 1, 3, 5, ...,  $2n-1$ , ... be divided into successive groups of  $r$  terms each, the sum of the terms of the  $n$ th group will be  $(2n-1)$  times the sum of the terms of the first group, or  $(2n-1)r^2$ .

Solved by H. S. VANDIVER, Bala, Pa., and E. D. GRABER, Professor of Mathematics, Genesee State Normal School, Geneseo, N. Y.

The  $n$  groups in question are